

UNIVERSITY OF BAHRAIN
COLLEGE OF INFORMATION TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE

ITCS 385 – Database Systems

Midterm
Semester II, 2012-2013

Date: Sunday, April 7th, 2013

Time: 3:00pm - 4:30pm

Name	DRAGON
Student I.D.	
Section	<div style="display: flex; align-items: center;"> <div style="margin-right: 20px;"> <p>[1]</p> <p>[2]</p> <p>[3]</p> </div> <p>Please tick one</p> </div>

Question 1 (PART A)	9	9
Question 1 (PART B)	9	9
Question 2	12	10
Question 3	12	5.5 + 5.5 = 11
Question 4	8	7.5
TOTAL	50	46.5

Notes:

1. Your answers must be written on the question paper and in the place allocated. Any answer written on any other place will not be marked.
2. Use the back of the pages for any rough work, BUT remember rough work will not be marked.
3. Do not give more than one answer (alternative solutions) to the same question; if you do so then only the first answer will be marked.
4. **Switch off your mobile** and keep it in your pocket or bag.

Question 1

PART A [3+ 6 = 9 marks]

1. Explain the meaning of the following terms:

Database

A collection of related data

User View

a partial of the database which the user can interact with the data.

2. Briefly compare between the traditional file-based processing of database applications and the DBMS approach with respect to the following viewpoint:

	TRADITIONAL FILE-BASED PROCESSING	DBMS APPROACH
Data Description and Structure	<p>each program has its own data and files.</p> <p>Each program is useful for only one data, and each modification in the data requires changing in the program.</p> <p>data are stored in different places.</p>	<p>the programs are independent from the data, Changing the data don't require changing the programs.</p> <p>All data are stored in one place, and it can be handled from multiple users.</p>

Question 1

PART B [5 +4= 9 marks]

1. Explain and show an example for each of the following terms:

Database Schema: the definitions of the tables of the data base, and the data type, the domain.

[Example]:

student table in a university database

ID	Name	Tel	GPA	address
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Database State: it is the database at particular moment of time with it's data, and it changes frequently

[Example]:

state of student table

201124	Ali	36660	3.9	Marmara
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2. Briefly explain the difference between the logical data independence and physical data independence? Support your answer with examples.

logical data independence is when changing the structures in the conceptual Schema, we don't have to change the application programs in the external view.

for example, if we want to add new attribute to the student table, we can add it without changing the programs which are in the external layer.

physical data independence is when modifying the internal layer in the database, we don't have to change too much in the conceptual layer and the external layer.

for example, if we change how the data is stored in the internal layer, we don't have to change too much in the above layers.

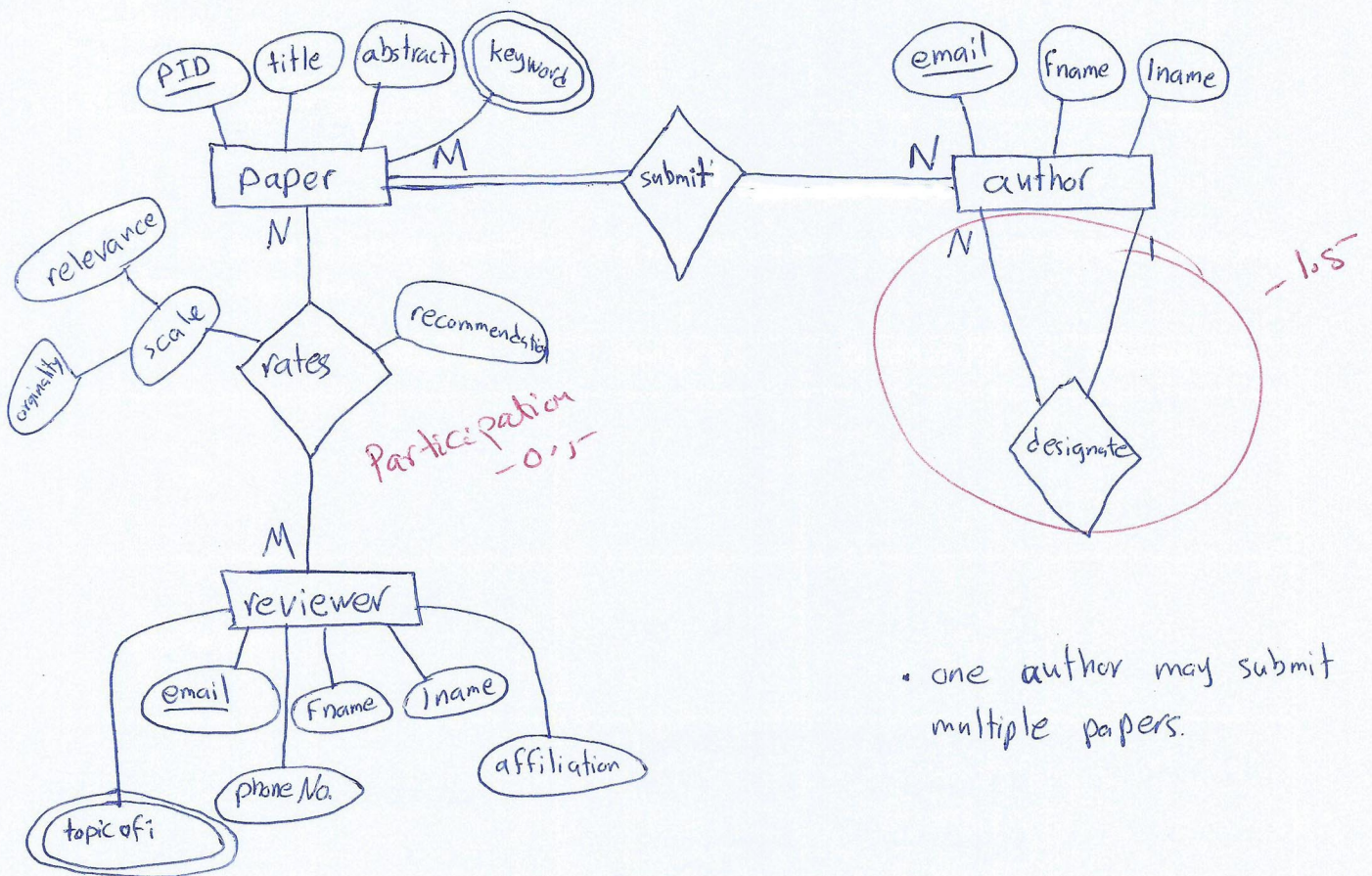
Question 2 [14 marks]

Consider the following requirements for a Conference_Review database in which authors submit research papers for consideration.

The database system is developed particularly for reviewers to record their comments with regards whether to accept or reject a submitted paper. Each submitted paper is assigned a unique identifier number by the system and is described by a title, abstract, keyword(s), and at least one author. Authors of papers are uniquely identified by email address, first and last names are also recorded. A paper may have multiple authors, but one of the authors is designated as the contact author.

Reviewers of papers are uniquely identified by email address. Each reviewer's first and last name, phone number, affiliation, and one or more topics of interest are also recorded. Each paper is assigned between two and four reviewers. A reviewer rates each paper assigned to him or her on a scale of 1 to 10 in two categories: originality, and relevance to the conference. Finally, each reviewer provides an overall recommendation regarding each paper to be accepted or rejected.

Design an ERD for this application. Note any unspecified requirements, and make appropriate assumptions to make the specification complete.



Question 3 [6 + 6=12marks]

Consider the following database schema and data definition for a car dealership database. The dealership consists of a number of departments. Each department has a number of salespersons, and a manager salesperson. Each car has a unique carID and can be sold only by one salesperson. Once the car is sold, it cannot be returned back to the dealership for another sale. A customer can buy many cars at the same time.

Car(CarID, Model, Price)

SalePerson(SalesPersonID, Name, Tel, DeptID)

Sales(SerialNo, SalesPersonID, CarID, SaleDate, CustomerCPR, CustomerName, SalePrice)

Department(DeptID, DeptName, ManagerID)

Attribute	Format
CarID	Integer
SalesPersonID	
SerialNo	
DeptID	
ManagerID	
CustomerCPR	
Name	Characters: size 25
Model	
DeptName	
CustomerName	
Tel	Integer: size 8

Attribute	Format
SaleDate	Date, Format:DD-MM-YYYY For example: 7 th April 2013, is stored as: 07-04-2013
Price	Floating point number, with two decimal places.
SalePrice	

PART A

Specify the primary, foreign, candidate, and alternate keys for each relation above, stating any assumption you make.

	Primary Key	Foreign Key	Candidate Key	Alternate Key
Car	CarID		CarID	✓
SalesPerson	SalesPersonID	DeptID	SalespersonID	✓
Sales	SerialNo	SalespersonID CarID • Sale price may be different	SerialNo CustomerCPR SalesPersonID	CustomerCPR -0.5
Department	DeptID	ManagerID	DeptID managerID	ManagerID

Assumption!

PART B

- Populate the relations in part (A) with a few example tuples (i.e. two/three tuples per relation), and then give an example of:
 1. A deletion that violates the referential integrity constraint.
 2. An insertion that violates the domain and key constraints.
 3. An update that does NOT violate any of the integrity constraints.

Car

CarID	Model	Price
1000	altima	8000.00
1001	accord	6000.00
1002	maxima	9000.00

Saleperson

SalesPersonID	Name	Tel	DeptID
70	Ali	1722 9444	5
80	Mohd	3666 8888	4
90	Ahmed	3999 1111	3

Sales

Serial No	SalesPersonID	Car ID	SaleDate	CustomerCPR	CustomerName	SalePrice
1	70	1000	08-03-2013	123456789	Adel	8000.00
2	90	1002	09-02-2013	987654321	Hassan	9000.00

Department

DeptID	DeptName	Manager ID
7	Nissan	70
8	Honda	80

- 1) delete from Car where CarID = 1000; { deleting the car with ID = 1000 will violate the referential integrity because it is a foreign key for Sales
- 2) insert into Saleperson values (70, 'Hussain', 'Hello', 6); { inserting SalesPersonID will cause key violation because it already exists, and inserting 'Hello' will violate domain constraint
- 3) updating Car ID = 1000 to Car ID = 2000 will not violate integrity constraints.

Question 4 [2 + 2 + 2 + 2 = 8]

Consider the database schema in Question (3) to write the following SQL queries.

1. Display the all car models available in the dealership (repeated model values should be displayed once).

```
select distinct (Model)
from Car;
```

2. List the ID, and name of all salespersons working in one of the following departments ID: 100, 200, 300.

```
select SalespersonID, name
from Salesperson
where DeptID=100 or DeptID=200 or DeptID=300;
```

3. List the carID, and SalePrice of all cars sold in year 2012.

```
select CarID, Saleprice
from Sales
where saledate like '%2012';
```

4. Write SQL statement to rename the 'Tel' attribute to 'Telephone' in SalesPerson relation.

```
Modify from Salesperson
rename coulonn Tel to 'Telephone';
```